Wide Temperature Rad-Hard ASIC for Process Control of a Fuel Cell System, Phase II

Completed Technology Project (2011 - 2013)

Project Introduction

Ridgetop Group developed a top-level design of a rad-hard application-specific integrated circuit (ASIC) for spacecraft power management that is functional over a temperature range of -180 to +130

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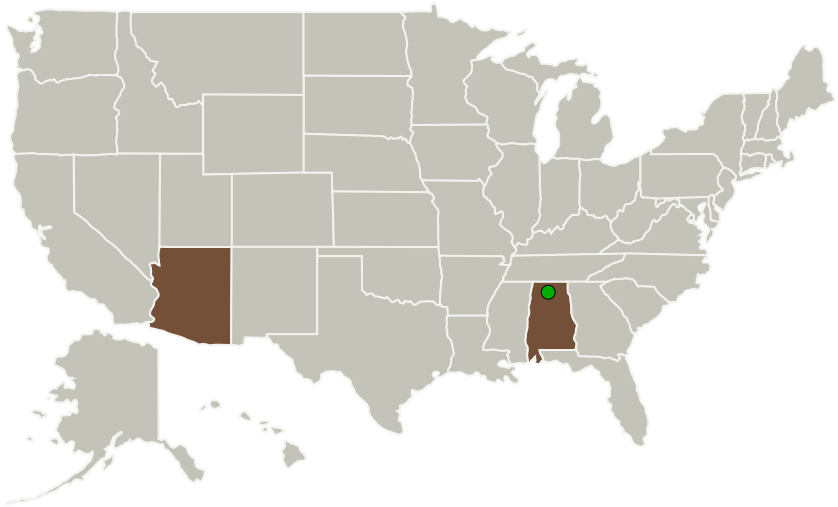
C. This ASIC is intended to work in conjunction with a fuel cell power system and battery backup to provide uninterrupted power to critical modules in space. Ridgetop has designed a novel integrated circuit for the power management of space systems. This design combines custom circuit modules with silicon-proven IP to create a system-on-chip solution. This application will be a single monolithic circuit designed for fabrication on the IBM 5AM SiGe process. The significance of this innovation is a single reliable component (ASIC) that will meet platform requirements for high voltage, wide operating temperature range, and radiation tolerance (minimum 100 krads total ionizing dose (TID), and 100 MeVcm2/mg single-event latchup (SEL)). Ridgetop has been working with a prime contractor to identify and flow-down mission requirements for the power management ASIC. During Phase 2, a final prototype unit will be fabricated to these specifications, and units will be packaged, tested, and silicon validation results will be produced. Estimated TRL at beginning and end of Phase 2 contract: Begin: 3, End: 6

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Ridgetop Group, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Tucson, Arizona
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Arizona

Project Transitions

June 2011: Project Start

August 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139556)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Ridgetop Group, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

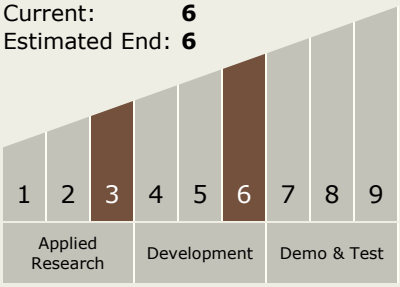
Carlos Torrez

Principal Investigator:

John Bush

Technology Maturity (TRL)

Start: **3**
Current: **6**
Estimated End: **6**



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Technology Areas

Primary:

- TX10 Autonomous Systems
  - TX10.1 Situational and Self Awareness
    - TX10.1.4 Hazard Assessment

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System